NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

PRESCRIBED BURNING

(Ac.)
CODE 338

DEFINITION

The use of fire as a tool to achieve a management objective on a predetermined area under conditions where the intensity and extent of the fire are controlled.

PURPOSE

* Control undesirable vegetation.
* Prepare sites for planting or seeding.
* Control plant disease.
* Reduce wildfire hazards.
* Improve wildlife habitat.
* Improve forage quantity/quality.
* Slash and debris removal.
* Enhance seed and seedling production.
* Sustain fire-dependent natural communities.
* Facilitate distribution of grazing and browsing animals.

CONDITIONS WHERE PRACTICE APPLIES

On all landuses.

CRITERIA

General Criteria

Cooperators will be cautioned to burn in accordance with state and local laws and regulations. They must understand that they may be liable for damages caused by fire escaping from their land or for damage caused to others from inadequate smoke management. They may also be responsible for fire suppression cost, should the fire escape the designated area.

Liability and safety precautions are to be planned before the burn and monitored during the burn.

Adjoining landowners within the anticipated airshed will be notified prior to burning.

Burn only when transport wind will carry smoke away from roads and residences unless adequate safeguards have been taken (traffic control, removal of residents, notification, etc.). People who have known respiratory problems should be removed from the area where smoke intrusion could occur.

Never burn within 1 mile of an airport, unless written permission is obtained from airport authorities.

In areas where there is an organized fire district, the cooperator will be advised to contact the local rural fire chief and/or the MDC Forestry Region Supervisor for the latest fire hazard information and other assistance. (See MDC Missouri Region Map-Sect. I of FOTG.)

The procedure, equipment, and number of trained personnel shall be adequate to accomplish the intended purpose. The timing of the burn will be based on, as a minimum: relative humidity, wind conditions, air temperature, and fuel conditions. Guidance is provided in; Example A-2 (Detailed Plan for Prescribed Burn) in the Appendixes of the USDA/NRCS National Range and Pasture Handbook.

Identify and locate on the plan map any potential hazard areas; (roads, headquarters,

residences, windbreaks, woodlands, electrical power poles and transmission lines, fences, flammable conduits, etc.).

Prior to the burn, firebreaks will be established that separate the area to be burned from those needing protection. A firebreak will be constructed according to specifications as stated in the burn plan, also see (Figure 1). A fire break is designed to contain the Backfire and Flankfire.

If grazing is planned, deferment following a burn will be based on sward height. Guidance can be found in Practice Standard Prescribed Grazing (528A), Section IV of the Missouri Field Office Technical Guide.

CONSIDERATIONS

Prescribed Burning is not meant to be an annual management practice. Burn only to meet a specific management objective. (see Purpose)

Generally, it is not necessary to burn more often than once every 3-5 years. When burning to control undesirable sprouting woody vegetation, it may be necessary to burn two or more consecutive years.

Weather conditions are generally most stable and favorable for burning following the passage of a weather front. Frontal passages are often accompanied by rain. Good burning conditions are frequently present 1-3 days following a rain.

Fire weather forecasts are provided on E-Mail during the burn season. Additional current weather information can be accessed on the Internet. (http://wxp.eas.purdue.edu, http://www.weather.com, http://intellicast. com/weather/usa/content.html, and others.)

Burn when the vegetation to be burned is dry enough to carry a fire well, but while the soil surface is still damp to the touch. Good soil moisture helps to keep the soil temperature low during the burn.

Generally, grass species are burned in spring when the desired grass has achieved 1-3" of new growth. This is usually from late February to late March for cool-season species and from early April to early May for warm-season species.

Burning in spring and fall of the same year will greatly reduce stands of cool-season grasses including tall fescue.

Late fall and winter burns generally favors the forb component in mixed stands and is useful in improving wildlife habitat. However, fall and winter burns can leave the site vulnerable to erosion for long periods. It is important that all effects are considered when planning this course of action.

Burning should be managed with consideration for wildlife needs so as to maintain or improve; nesting, brooding, winter and escape cover.

For prescribed burns on wildlife land, a NRCS or MDC biologist can provide good information to prevent unfavorable effects on wildlife habitat or other species of concern.

Reducing the fuel height to about 1 foot next to the fireline, greatly reduces the intensity of the fire at the fire line. Removing snags and brush piles near firebreak helps prevent fires from escaping or spotting over.

Existing barriers such as lakes, streams, wetlands, roads, and constructed firebreaks can be used as primary or secondary firebreaks and are important to the design and layout of this practice.

Woodlands that have site indexes sufficient to permit the economic production of timber should generally not be burned. If the timber species is subject to fire scarring, but it becomes necessary to burn the site, the burn prescription should specify fires with very low heat intensities.

Generally, the most effective time for controlling unwanted woody species is late spring when carbohydrate reserves are at their lowest.

For MO-NRCS Policies on Prescribed Burning; see Missouri Supplement Appendix A, MO-NRCS Policy on Prescribed Burning, of the National Range and Pasture Handbook. (Appendix MO1 A-1)

For job approval requirements in Missouri; see Example MO A-1 JOB APPROVAL AUTHORITY FOR MO-NRCS EMPLOYEES THAT PLAN AND APPLY PRESCRIBED BURNNING, in the National Range and Pasture Handbook (Appendix MO2 A-1 and A-2) and Example MO A-2 REQUEST FOR PRESCRIBED BURNING JOB APPROVAL (Appendix MO2 A-3 and A-4).

PLAN SPECIFICATIONS AND APPLICATION

In Missouri, specifications will be developed for each identifiable Prescribed Burn and recorded using; Example A-2 (Detailed Plan for Prescribed Burn) found in the appendixes of the USDA/NRCS National Range and Pasture Handbook (Appendix A-5 - A-9). A Detailed Plan for Prescribed Burning will be filed with and referred to in the conservation plan.

1. The Detailed Plan for Prescribed Burning is specific to the area and for the burning season planned. If the plan is to be used for a subsequent burn season it is necessary to revise the plan to address the current situation.

2. On the day of the burn notify all appropriate units of government and adjoining landowners of intent to burn. These will be specified on the plan.

3. The plan will specify the necessary tools, equipment, and personnel to contain the fire within the area planned for prescribed burning. Specified tools, equipment, and personnel will be on site and ready for deployment prior to initiation of the prescribed burn plan.

4. The Burn Boss and/or Crew Leader will make sure all participants are properly dressed, in good physical condition and are properly trained.

5. The Burn Boss and/or Crew Leader will check all firebreaks to ensure that there is no fuel continuity across them.

6. Start a burn only after the pre-burn checklist has been completed, the plan has been reviewed, signed and all factors are within prescription as set forth in the prescribed burn plan specific to the field being burned.

7. Provide protection to potential hazard areas as identified on the plan.

8. Conduct a test burn on the down wind side of the planned burn area and within the protection of an established firebreak. Use the test burn to confirm that the fire will burn as predicted, the burn will achieve the planned objective and that smoke can be managed as planned.

9. Defer the burn if the test burn is not satisfactory or if prolonged drought has caused high fire danger levels. Burn only within the prescription set forth in the Detailed Plan for Prescribed Burning.

10. Most prescribed burns in Missouri are conducted with the Ring Fire Technique. To begin, a Backfire is carefully laid down on the down wind side of the area to be burned and within the protection of an established fireline. The Backfire should be allowed to create a burned firebreak a minimum of 50 feet wide on the down wind side of the planned burn area, before extending it into a Flanking Fire. CAUTION: (On steep slopes > 20%, and when wind speed is light < 5 mph, fire movement may be directed up slope, being influenced more by slope than wind direction.)

11. Extend the ends of the Backfire up each flank, still burning from an established fireline, creating a Flanking Fire and establishing a burned firebreak along the sides of the planned burn area. The ignition crew lays the Backfire and Flanking Fire and controls the pace of the burn. The ignition crew must be careful not to lay fire faster than the holding crew can comfortably keep it controlled.

12. Once the Backfire and Flank Fires have burned out a safe firebreak, the Headfire can then be set. Burning with the wind the Headfire will more rapidly complete the burn. Headfires burn with much more intensity, greater flame length and move much more rapidly. Be sure all personnel are safely out of the Headfire's path before ignition. Make certain that firebreaks have been extended sufficiently with Backing and Flanking fires, to insure that the intensity of the Headfire will be safely contained. See (figure 2) for Ring Fire and other Firing techniques.

13. Patrolling the fire lines throughout the course of a prescribed burn permits the burn crew to find and extinguish any escapes or spot over fires that may occur before they become a significant event.

14. After the Headfire and Backfire meet, make sure the fire is completely out before leaving the area. Permitting large fuels to smolder after the initial fire has passed, greatly contributes to the problem of residual smoke.

ADDITIONAL CONSIDERATIONS FOR SMOKE MANAGEMENT PLANNING

Avoidance, Dilution, and Emissions Reduction are ways to manage smoke from prescribed fires.

Avoidance: Pollution can often be prevented by planning burns when conditions that make intrusions of smoke into sensitive areas unlikely. Stagnant high pressure systems usually cause problems with smoke dispersion and burning under those conditions should be avoided when smoke management is critical. Most fires have an active burning period and a residual period (see Residual Smoke). Wind directions during both periods must be carefully considered.

Dilution: Smoke concentrations can be reduced by diluting smoke through a greater volume of air, either by scheduling burns during good dispersion conditions or burning at slower rates (burning smaller or narrower strips or smaller areas). Burning at slower rates may mean burning later into the evening. Usually, a morning burn has improving rates of ventilation; an evening burn generally faces deteriorating ventilation conditions.

Emission Reduction: Backing fires more completely consume the fuel load during the active burning period which allows more smoke to be entrained in the convection column. This minimizes the inefficient smolder phase of a prescribed fire. Scheduling fires when duff and larger fuels are too wet to burn also reduces emissions.

1. Atmospheric stability is the degree to which vertical motion in the atmosphere is enhanced or suppressed. An unstable atmosphere enhances vertical motion, hence increases mixing and the dispersion of smoke. A stable atmosphere suppresses vertical motion, thereby limiting the dispersion of smoke.

2. When smoke management is critical, burn when conditions are good for rapid dispersion of smoke. The atmosphere should be somewhat unstable so that the smoke will rise and dissipate; but not so unstable as to be problematic in controlling the burn.

3. Residual smoke associated with smoldering larger slash or brush fuels can cause serious visibility problems, especially at night, if not carefully planned.

4. Heavy, carbon laden smoke, has caused dangerous discharges from overhead, electrical transmission lines.

DEFINITION OF TERMS

Backfire: A fire set to spread against the wind to remove flammable material and thus help to stop or control the Headfire. Backfires consume a greater portion of the fuel load and may be prescribed for the entire burn in some instances.

Burn Boss: A person, with appropriate job approval authority, that supervises all phases of the application of a prescribed burn.

Convection Column: That portion of a smoke plume sharply defined by the buoyant forces of heated air and effluents.

Crew Leader: A person, selected by the Burn Boss, that directs the activity of firing and holding crews during the application of a prescribed burn.

Firebreak: A space which is clear of flammable materials to stop or check fires. It also serves as a line from which to work and to facilitate the movement of personnel and equipment. Plowed areas, previously burned areas, wetted areas, roads, lakes, cool season grass, winter wheat, etc. serve as firebreaks.

Fire Intensity Reduction Line: A line constructed by reducing the height of the fuel next to the firebreak which greatly reduces the intensity of the burn at the firebreak.

Flankfire: The sides of a fire between the Headfire and the Backfire. Flankfires spread perpendicular to the wind direction.

Headfire: A fire which is set to spread rapidly with the wind and usually used in conjunction with backing and flanking fires. Headfires though intense move rapidly and don't as fully consume the available fuel during the initial fire as does backing or flanking fires. This causes more fuel to be left unburned or smoldering on the site.

Inversion: A layer of atmosphere where temperature increases with height. May be caused by warming aloft, like that associated with subsidence (subsidence inversion), or by cooling from below, as occurs at night at the surface (radiation inversion).

Mixed or Mixing Layer: That portion of the atmosphere from the surface up to the Mixing Height. This is the layer of air, usually a sub-inversion layer, within which pollutants are mixed by turbulence and diffusion.

Mixing Height: The height above ground through which relatively vigorous vertical mixing occurs. Mixing Height varies throughout the day and is normally lowest late at night or early morning and highest during mid- to late afternoon.

Particulate Matter: Any liquid or solid particles. "Total suspended particulates" as used in air quality are those particles suspended in or falling through the atmosphere, ranging in size from 0.1 to 100 microns.

Residual Smoke: Smoke produced after the initial fire has passed through the fuel and not entrained in the Convection Column. In complex terrain residual smoke can flow down drainages at night, causing poor visibility and other problems. In addition, the Particulate Matter can serve as nuclei for fog formation further reducing visibility.

Smoke Intrusion: Smoke from prescribed fire entering a designated area at unacceptable levels.

Smoke Management: Conducting a prescribed fire under fuel moisture and meteorological conditions, and with firing techniques that keep the smoke's impact within acceptable limits.

Subsidence: Downward or sinking motion of air in the atmosphere. Subsiding air warms due to compression. Increased temperature and decreasing humidities are present in subsiding air. Subsidence results in a stable atmosphere inhibiting dispersion.

Transport Wind Speed: A measure of the average rate of the horizontal transport of air within the Mixing Layer. May also be the wind speed at the final height of plume rise. Generally refers to the rate at which emissions will be transported from one area to another.